

## **Task-induced strategic processing in L2 text comprehension**

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### **Abstract**

Strategic text processing was investigated for English as a foreign language learners who processed and recalled a text when they read for expression, for image, and for critique. The results indicated that, although the amount of content recall (i.e., products of comprehension) was similar, the relative contributions of second language (L2) proficiency and general comprehension skill differed between task conditions (Experiment 1). Think-alouds produced during reading (i.e., processes of comprehension) indicated that the amount of resource allocation to word analysis, reaction and evaluation, and self-monitoring differed between task conditions (Experiment 2). Thus, task instructions may induce strategic L2 text processing, where L2 proficiency and general comprehension skill intervene in the comprehension processes differently depending on the reading goal.

**Keywords:** strategic reading, task, allocation of resources, processes and products of comprehension, L2 proficiency, general comprehension skill

Flexible, strategic text processing is important for successful communication and knowledge acquisition in this information driven world. Flexible, strategic reading proficiency requires that individuals possess the ability to adjust cognitive processes and strategies in order to fit a reading goal in a given situation. Although this kind of processing skill is acquired as one gains experience in reading and literary activities (Baker & Brown, 1984; Forrest-Pressley & Waller, 1984), it may be more important to less experienced readers, including foreign or second language (L2) learners, because it affects the quality of reading experiences and subsequent learning (Israel, Block, Bauserman, & Kinnucan-Welsch, 2005). In order to help develop strategic reading proficiency, reading exercises or tasks, typically by providing a passage with some comprehension guiding questions, are routinely assigned to students in the L2 classroom. However, it is not fully clear how a particular reading task would influence L2 learners' text processing and their resulting comprehension. It is also little understood which processes and strategies are under L2 learners' control and contribute to successful text comprehension.

The goal of the present study is two-fold. First, the study was designed to examine how a reading goal induced by task instructions may influence text comprehension for L2 readers with limited language proficiency. Second, the study was to demonstrate the value of examining the relation

between processes and products of L2 text comprehension and to draw implications for teaching and learning.

## Background

### *Process and Representation of Text*

Reading is an intentional act. Readers engage in interactive processing which consists of bottom-up data-driven processing and top-down conceptually driven processing. Successful comprehension of a text requires that readers not only recognize words, analyze sentences to extract propositions, but also encode textual information, together with inferences generated from relevant general knowledge, as a coherent representation of the text in memory. The construction of this representation of the text occurs moment by moment as the reader progresses through the text (the on-line process). Psychological models of reading comprehension distinguish between the products of comprehension and the processes that lead to these products and describe how they are causally related (e.g., Kintsch, 1998; Trabasso & Suh, 1993).

Although there are different theories and models, researchers generally accept that the representation of the text constructed in memory consists of multiple levels (Graesser, Millis, & Zwaan, 1997; Kintsch, 1998; van Dijk & Kintsch, 1983; van Oostendorp & Goldman, 1999). Major levels are the *surface code* (i.e., memory for the surface linguistic structure of the text), the *propositional text base* (i.e., memory for the meaning that is explicitly stated in the text), and the *situation model* (i.e., memory for events, states, and actions that occur or ideas that are presented in the micro-world that the text describes). The surface code decays fast or is most susceptible to forgetting. Successful text comprehension requires the construction of a coherent representation at the propositional text base and the situation model levels. The propositional text base and the situation model both contain inferences generated from general knowledge; the latter includes greater amounts of knowledge-based inferences than the former. The situation model representation is most stable; the stronger situation model enables better performances in a later task (e.g., recall) that requires use of text memory. In addition, many researchers assume that there are yet higher levels of representation such as the *communication level* (i.e., memory for the communicative context which includes the writer, the text and the readers) or the *genre level* (i.e., memory for type of genre and its textual characteristics).

### *Resources Allocation and Reading Goal*

Due to the limitations of human cognitive capacity, how to allocate cognitive resources to various types of information processing during reading is important to successful text comprehension (Baker & Brown, 1984; Britton & Glynn, 1987). Allocation of cognitive resources during reading depends in part on the reading goal and strategy use in a given situation (Alexander, Jetton, & Kulikowich, 1996; Baker & Brown, 1984; Kintsch, 1998; McNamara, 2007; Pressley & Afflerbach, 1995). Research has shown that mature readers adjust cognitive processes and strategies according to a reading goal. For example, Zwaan (1993, 1994), examining readers who were told to read either news stories or literary stories (although they were given the same narrative texts), found that those in the news condition constructed stronger

situation model representations of the texts than those in the literary condition, whereas the readers in the literary condition constructed stronger surface code representations than the readers in the news condition.

Van den Broek, Lorch, Linderholm, and Gustafson (2001), examining the readers who were told to read an expository text either for entertainment or for study, found that those in the study condition generated more backward explanatory inferences and more predictive inferences during reading and recalled more ideas, while those in the enjoyment condition verbalized more associations and more evaluative comments during reading and recalled fewer ideas. Based on the findings, van den Broek et al. (2001) proposed that readers with different reading goals employ different standards of coherence and generate different types of inferences according to the standards. Likewise other studies have shown that readers generate different patterns of inferences depending on the reading goal (i.e., read to explain, predict, or understand) (Magliano, Trabasso, & Graesser, 1999), and that readers process and recall a text differently depending on its relevance to the perspective (given as task instructions) (Kaakinen & Hyona, 2005; Lehman & Schraw, 2002; McCrudden, Schraw, & Kambe, 2005).

As for L2 reading, there are only a few studies conducted so far on the effect of task on text processing (Grabe, 2009). In one study (Horiba, 2000), comparing first language (L1) and L2 readers who were told to read expository texts either freely or for coherence, the effect of task on the processes was smaller for L2 readers than for L1 readers. L1 readers in the read-for-coherence condition generated more backward inferences and more comments on text structure and fewer associations during reading than their counterparts in the read-freely condition. L2 readers' processes did not differ substantially between the two task conditions, though their recall in the read-for-coherence condition was better than the read-freely condition and was as good as that of L1 readers in the same condition. It is likely that limited language proficiency caused L2 readers to allocate large amounts of cognitive resources to lower-level processing, inhibiting them from higher-level processing including relational, integrative processing. It was also reported, based on the qualitative analysis of think-alouds (Horiba, 2000), that some L2 readers in the read-freely condition engaged in relational, integrative processing as a compensatory strategy, which would reduce the quantitative differences in think-alouds between the read-for-coherence condition and the read-freely condition. In order to understand the effect of task on L2 text comprehension, further research is needed which investigates both the processes and products of comprehension under contrasting task conditions.

As has been frequently discussed in the literature, L2 reading tends to be influenced by both level of L2 proficiency and (L1-based) general comprehension skill (Alderson, 1984; Carrell, 1991). Contributions or transfer of (L1-based) general comprehension skill to L2 reading may depend on level of language proficiency (Bernhardt & Kamil, 1995; Lee & Schallert, 1997) and the linguistic distance between L1 and L2 (Koda, 2005). Therefore, research is also needed for investigating how L2 proficiency and general comprehension skill might interact with the effect of task on L2 text comprehension.

## Study

The present study was designed to examine the effect of a reading goal on the processes and the products of L2 text comprehension. In the study, consisting of two experiments, three different task instructions were used in order to manipulate the setting of a reading goal and strategy use for L2 students who were asked to read argumentative essays. Some students were told to pay attention to words and expressions used in a text (the Expression condition). Others were told to visualize in their minds events, states, and actions that are described in a text (the Image condition). Yet others were told to compare the author's views with their own views and evaluate them (the Critique condition). The choice of these task instructions was motivated by educational and theoretical considerations. In the first experiment, recall (as the products of reading comprehension) and the relation of L2 proficiency and general comprehension skill to recall were examined. In the second experiment, think-alouds produced during reading (as the processes of reading comprehension) and their relations to recall were examined.

## Experiment 1

The research questions set out are as follows:

1. Does L2 text comprehension measured by recall differ when L2 readers have different reading goals?
2. Do the relations between L2 text comprehension and L2 proficiency and general comprehension skill differ when L2 readers have different reading goals?

## Method

### *Participants*

Eighty-four college English as foreign language (EFL) students participated. They were native speakers of Japanese (19 males and 65 females; average age = 19, range = 18-21) who majored in English and were enrolled in first-year English courses at a university in Japan. Their level of L2 proficiency was measured several months prior to the study with an in-house standardized English proficiency test consisting of reading, grammar, listening, writing and speaking sections. The English proficiency test had been validated and regularly used for placement purposes. Their level of L2 proficiency was around TOEFL 430-450.

### *Materials*

The reading texts used were two passages (entitled 'Street rules' and 'Eye contact') in two language versions, the participants' L1 (Japanese) and their L2 (English). Both versions were published in a major newspaper, *Asahi*. The passages are so-called argumentative essays written in a typical Japanese style called the "*ki-sho-ten-ketsu*" (introduction, follow-up, change, conclusion) (Hinds, 1983, 1984). Each text contains 356-402 words in Japanese or 420-443 words in English. The Flesch-Kincaid Grade level for the Street text and the Eye text in English

version was 8.4 and 10.7, respectively. A sample text is shown in Appendix A.

### *Procedure*

*General guidelines.* First, general instructions for the study were orally provided to participants in their L1. Then they were given a materials packet and told to do the reading task by following the given instructions. After finishing reading, they solved some arithmetic problems and then engaged in a recall task. The arithmetic problems were given to ensure that in the recall task they would retrieve information about the text from long-term memory, not from short-term memory. This sequence of read and recall was repeated for the second text. The entire experiment was completed in approximately 40 minutes.

*Task instructions.* Three task instructions were used in the study. In the Expression condition, participants were told to read a text by paying attention to words and expressions, especially those unfamiliar to them. In the Image condition, participants were told to read a text by visualizing in their minds events, actions and situations that are described in the text. In the Critique condition, participants were told to read a text by comparing the author's views with their own to evaluate them. In all conditions, the participants were informed of a later recall task (in L1).

These task instructions were selected for theoretical and educational interests. The Expression condition would encourage active lower level linguistic processing, which may help analyze and infer the meaning of unknown words and expressions, thus contributing to the construction of stronger (surface code and propositional text base) representations. The Image condition would encourage conceptual processing and active generation of explanatory and elaborative inferences from relevant general knowledge, which may result in the construction of stronger (propositional text base and situation model) representations. The Critique condition would encourage higher level conceptual processing which involves use of literacy knowledge about the reader-writer communication as well as relevant general knowledge, possibly leading to the construction of stronger (situation model and communication level) representations.

Participants read one passage in one language and read the other passage in the other language; they read one text in one task condition and the other text in another task condition. Thus, each participant processed two texts, one in either L1 or L2, and engaged in two (out of three) different task conditions. The combination and the order of text topic, task condition, and language were counterbalanced.

*Recall task.* In the recall task, participants were asked to write down in their L1 (without referring back to the original text) everything that they remembered of the content of the text for the title provided. They were encouraged to write as much as they could as if to describe the content of the text to someone who never read it.

### *Analysis*

Regarding level of L2 proficiency, a summary of the participants' composite scores (excluding speaking scores) is presented in Table 1. A two-way analysis of variance (*ANOVA*) measure

revealed that there were no significant effects of task,  $F(2,77) = 2.298$ , passage,  $F(1,77) = .529$ , and task-passage interaction,  $F(2,77) = .560$ , at  $\alpha = .05$ , indicating that the participants were similarly distributed to cells in terms of level of L2 proficiency.

Table 1. *L2 proficiency scores by passage and task condition in Experiment 1*

Task condition	Passage					
	Eye			Street		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Expression	13	38.0	9.1	13	43.5	6.2
Image	13	41.8	8.1	12	42.9	9.4
Critique	14	39.2	9.1	13	41.0	6.4

*Note.* Maximum score = 75. The scores for six participants were missing.

Each participant's recall protocols were analyzed by using two different criteria: proposition recall and event recall. The text was parsed into propositions (that are the smallest units of meaning and are verifiable) by using the procedures proposed in Bovair and Kieras (1985) and van Dijk and Kintsch (1983). Propositions recalled indicate what details of the content of a text the reader understood and remembered from the reading of the text. The text was also parsed into events, actions or states that are equivalent to subject-verb clauses using the predicate rule as a basis (Trabasso, van den Broek, & Suh, 1989). Events recalled indicate which events, actions and states described in a text the reader understood and remembered from the reading of the text. All recall protocols were scored independently by three raters proficient in Japanese and English. The interrater reliability averaged .93; all discrepancies were resolved through discussion.

The percentage of recall was calculated for each reader and then for each group. In order to examine the effect of task and passage, a two-way *ANOVA* was conducted on recall. Correlations were also analyzed between recall of L2 text and each of L2 proficiency scores (as index of level of L2 proficiency) and recall of L1 text (as index of general comprehension skill). It was found that the correlations between proposition recall and event recall were reliably high for task condition ( $r = .93-.97$ ) and for passage ( $r = .94-.95$ ) and that the patterns of the results were fairly similar between the two types of recall. Therefore, only the results of event recall will be discussed in the following section.

## Results

### *Recall as a Function of Task Condition*

Table 2 shows a summary of the percentage of events recalled. Not surprisingly, recalls were better when reading in L1 ( $M = 37.8$ ,  $SD = 13.1$ ) than when reading in L2 ( $M = 22.6$ ,  $SD = 11.8$ ). For both reading in L1 and in L2, descriptively speaking, greater amount of content information was recalled under the Image condition than the other conditions and content recall was poorest in the Critique condition. A two-way *ANOVA* with task and passage as between-subjects variables was conducted for language. When reading a text in L2, there were no significant differences in recall between task conditions,  $SS = 332.76$ ,  $F(2,83) = 1.23$ ,  $p = .30$ . The Street text was significantly better recalled than the Eye text,  $SS = 664.67$ ,  $F(1,83) = 4.93$ ,  $p = .03$ , and

the interaction between task and passage was not significant,  $SS = 25.91$ ,  $F(2,83) = .10$ ,  $p = .91$ . When reading a text in L1, there were no significant effects on recall for task condition,  $SS = 88.01$ ,  $F(2, 73) = .24$ ,  $p = .60$ , passage,  $SS = 49.54$ ,  $F(1,83) = .60$ , and the task-passage interaction,  $SS = 111.09$ ,  $F(2,83) = .31$ ,  $p = .74$ .

Table 2. *Recall as a function of language and task condition in Experiment 1*

Task condition	Language					
	L1			L2		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Expression	31	37.7	12.1	30	23.8	13.4
Image	28	39.1	13.6	26	24.4	9.8
Critique	25	36.6	14.3	28	19.8	11.5
All conditions	84	37.8	13.1	84	22.6	11.8

### *Relation between L2 Reading and L2 Proficiency and General Comprehension Skill*

In order to examine how level of L2 proficiency and general comprehension skill are related to L2 reading, the correlations between L2 text recall and L2 proficiency and between L2 text recall and L1 text recall were analyzed. Recall scores were considered to reflect the participants' comprehension of a text; recall scores for L2 text indicate degree of L2 reading comprehension, while recall scores for L1 text are used as an index of general comprehension skill that is observed in L1 reading. Table 3 shows a summary of the correlations.

Table 3. *Correlations between L2 reading and L2 proficiency and general comprehension skill*

Task condition	L2 proficiency		General comprehension skill	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Expression	0.298	0.140	0.453	0.010
Image	0.638	0.001	0.501	0.009
Critique	0.509	0.007	0.536	0.003
All conditions	0.466	<.0001	0.481	<.0001

There were some differences in the patterns of correlations between L2 reading and L2 proficiency and general comprehension skill between different task conditions. In the Expression condition, the correlations were lower than the cases of the other task conditions. In the Image condition and the Critique condition, L2 reading had reliable moderate to relatively high correlations with both variables. However, relative strengths of the correlations differed between the two conditions. In the Image condition, L2 reading had stronger correlations with L2 proficiency, whereas in the Critique condition L2 reading had slightly stronger correlations with general comprehension skill. An *ANCOVA* was conducted on L2 text recall using L2 proficiency and general comprehension skill as covariates and task condition and passage as independent variables. In addition to the significant effects of L1 reading,  $F(1,77) = 12.155$ ,  $p = .0008$ , and L2 proficiency,  $F(1,77) = 8.485$ ,  $p = .005$ , the effect of task was near significant,  $F(2,77) = 2.692$ ,  $p = .07$ , indicating that task condition influenced L2 reading even when the effects of L2 proficiency and general comprehension skill were statistically controlled. The effect of passage,  $F(1,77) = 3.159$ ,  $p = .08$ , approached a significant level, and there were no significant

interactions between task and passage,  $F(2,77) = .383, p = .68$ .

## Discussion

Regarding the first research question: *Does L2 text comprehension measured by recall differ when L2 readers have different reading goals?* The finding of content recall suggests that L2 text comprehension may not differ in terms of the amount of content information recalled as a function of reading goal. Lack of significant differences in the amount of content recall may be related to the general nature of task instructions. In fact, there were also no significant effects of task condition in L1 reading. In the present study, the students were only told to read a text in a certain way; they were not forced to alter their processing behaviors. If they were given more specific instructions (e.g., search for specific information; McCrudden et al., 2005) or asked to engage in an additional behavioral task (e.g., answering questions, outlining and crossing out some letter; McDaniel, Einstein, Dunay, & Cobb, 1986), task effects might have been found in recall. In addition, the advanced notice of a recall task may have reduced the effect of task condition. It is likely that L2 learners tried to achieve a comprehension goal regardless of the specific task instructions they had received.

Regarding the second research question: *Does the relation between L2 text comprehension and L2 proficiency and general comprehension skill differ when L2 readers have different reading goals?* The results of Experiment 1 suggest that there may be some differences between task conditions in terms of how L2 proficiency and general comprehension skill (indexed by L1 text recall) may contribute to L2 text comprehension. More specifically, in the Expression condition, both L2 proficiency and general comprehension skill had lower correlations with L2 text comprehension than in the cases of the other conditions. The correlation between L2 proficiency and L2 text comprehension in the Expression condition was particularly low and unreliable. In the Image condition, both L2 proficiency and general comprehension skill had reliable relatively high correlations with L2 text comprehension, with L2 proficiency being stronger than general comprehension skill. Likewise L2 text comprehension in the Critique condition had reliable relatively high correlations with L2 proficiency and general comprehension skill; however, general comprehension skill seemed to be as equally strong as, if not stronger than, L2 proficiency. Furthermore, when controlling for the effect of L2 proficiency and general comprehension skill statistically, the effect of task condition emerged (as near significant,  $p = .07$ ). These results suggest that the contributions of L2 proficiency and general comprehension skill to L2 reading comprehension were somewhat different when L2 readers processed a text with different reading goals.

Plausible interpretations of the findings from Experiment 1 are as follows. In the Expression condition, readers tried to allocate more resources to the analysis of unknown words and expressions in a text. This emphasis on word analysis may have caused mixed consequences. Focus on lower level linguistic processing may facilitate inferring the meaning of an unfamiliar word or expression. However, heavy resource allocation to a particular local item may cause a shortage of resources that are needed for conceptualization of the text's content or it may disrupt the process of building a larger, more coherent representation of meaning. As a result, there were no reliable correlations between L2 text recall and L2 proficiency in this condition. In the Image condition, readers tried to understand the ideas and events described in a text and to construct a



situation model representation by actively using general knowledge. Level of L2 proficiency should be a critical factor for the extraction of propositions from the sentences, while general comprehension skill should be important to the elaboration and integration of textual information to build a coherent representation of the text. As for the Critique condition, readers not only tried to understand what the text is describing but also tried to react to and respond to the text or the author. Reacting and responding to the text/author requires higher level conceptual processing that is related to the writer-reader communication level representation. Therefore L2 text recall had stronger correlations with general comprehension skill, compared with the case in the other conditions.

These interpretations of the findings are speculative and need verification. Whether or not lower-level linguistic processing is emphasized and conceptual processing de-emphasized in the Expression condition, both linguistic processing and active use of general knowledge occur in the Image condition, and higher (communication level) conceptual processing is engaged in the Critique condition need to be scrutinized with further investigation. In order to elucidate the effect of reading goal on L2 text processing, it is necessary to examine the online processes that L2 readers engage in while progressing through a text. A second experiment was set up on another group of L2 readers who received the same task instructions as in Experiment 1. In Experiment 2, the process of text comprehension was examined via think-alouds produced during reading and the product of comprehension was examined via content recall produced after reading.

## Experiment 2

The research questions prepared for Experiment 2 are as follows:

1. Does the process of text comprehension (measured by think-alouds) differ when L2 readers have different reading goals?
2. How does the process of comprehension (measured by think-alouds) relate to the product of comprehension (measured by recall)?

## Method

### *Participants*

Twenty-eight college EFL students who were English majors and were enrolled in an Applied Linguistics course participated. They were all native speakers of Japanese from the same university as those who participated in Experiment 1. None of them had participated in Experiment 1. They consisted of 8 sophomores, 13 juniors, and 7 seniors (9 males and 19 females; the average age = 20.3, range = 19~25). Two participants who did not follow instructions or did not complete all the tasks were removed from the analysis. The data from the remaining 26 participants were submitted to analysis.

## *Materials*

The text was the English version of the Eye text that was used in Experiment 1.

## *Procedure*

*General guidelines.* Data collection was conducted in a media room during one of the participants' regular class periods. Participants were each seated in a booth with recording equipment with a space between every two seats. After a practice session, participants read the text for comprehension by using the think-aloud technique. Participants were randomly assigned to one of the three task conditions with each grade level distributed across task conditions. After reading, they solved some arithmetic problems and then did a recall task. Throughout the data collection, six proctors stayed in the room to assist with the procedure.

*Task instructions.* The same three task instructions, the Expression, the Image and the Critique condition, as in Experiment 1, were used.

*Think-aloud task.* After the experimenter explained and demonstrated the think-aloud technique, participants practiced the technique by using a practice passage. They were told to verbalize in their L1 whatever thoughts came into their mind while reading each sentence (Ericsson & Simon, 1980; Olson, Duffy, & Mack, 1984). For the practice session, they were all told to read the text for comprehension. After the practice session, they were given the test passage. As in the practice passage, there was a red slash line at the end of each sentence to remind the readers to verbalize their thoughts. If a participant did not speak after two sentences, he or she was reminded by a proctor about the instructions to verbalize their thoughts. The participants' verbal reports were tape-recorded.

*Recall task.* Participants were asked to write down in their L1 everything that they remembered of the content of the text. They were encouraged to write as much as they could as if describing the content of the text to someone who had not read it. They practiced the recall task on a practice passage.

## *Analysis*

*Think-louds.* Verbal reports were transcribed from audiotapes and then parsed into statements (roughly equivalent to clauses). Each statement was placed into one of ten categories. The categories were predetermined on the basis of theoretical interests and the research questions. They were selected by adapting the categories used in prior research (Block, 1986; Coté, Goldman, & Saul, 1998; Horiba, 1996, 2000; Linderholm & van den Broek, 2002; Trabasso & Suh, 1993; van den Broek et al., 2001). The ten categories used in this study were *word analysis*, *sentence analysis*, *backward inferences*, *predictive inferences*, *association*, *evaluation*, *reaction*, *self-monitoring*, *text structure* and *other*. In terms of general process level, word analysis and sentence analysis are included in *structure analysis* where the reader attempts to analyze the formal or semantic features of the linguistic item in order to extract propositions. Backward and predictive inferences are considered as *in-text inference* where the reader tries to make a

connection between the content of the current sentence and prior text or incoming text. Association, evaluation, and reaction are considered as *reader response* where the reader generates association, reaction or evaluation about the text or the author. The categories and examples are shown in Appendix B. Because all the comments on text structure overlapped with the comments in other categories, they were not included in subsequent analysis.

Two raters scored five participants' protocols by using a list of the categories and definitions and discussed the scoring criteria in detail. After finalizing the categories and the detailed scoring criteria, one rater scored all the protocols and the other randomly selected one-fourth independently. Interrater reliability of .85 was obtained. All the discrepancies were resolved through discussion.

The frequency and the percentage of think-alouds in each category were calculated for individuals and for the group. The rank order and the patterns of the think-alouds categories were examined and compared between task conditions. In addition, the amount of time (seconds) spent on reading a text with the think-aloud technique was also calculated by using a stopwatch. There were large individual differences in reading time (Expression:  $M = 841.9$ ,  $SD = 265.0$ ; Image:  $M = 720.9$ ,  $SD = 251.9$ ; Critique:  $M = 800.1$ ,  $SD = 229.9$ ). The effect of task condition on reading time was not significant ( $ANOVA$ :  $MS = 29726$ ,  $F(2,25) = .48$ ,  $n.s.$ ) probably due to the small sample size.

*Recall.* Recall data were analyzed for event recall by using the same procedure as in Experiment 1. All the recall protocols were scored separately by two independent judges, yielding a .91 interrater reliability. All discrepancies were resolved through another scoring by one rater. A one-way analysis of variance was conducted on recall to examine the effect of task condition.

## Results

### *Think-aloud Protocols*

A summary of the number of think-aloud comments for nine categories by task condition is presented in Table 4. On average, the Expression condition produced a greater number of think-aloud comments ( $M = 81.7$ ) than for readers in the Image condition ( $M = 68.6$ ) and the Critique condition ( $M = 68.0$ ). The Expression condition ( $SD = 54.9$ ) and the Image condition ( $SD = 55.3$ ) had much larger differences among individuals than the Critique condition ( $SD = 37.5$ ). In all conditions, readers produced the greatest number of think-aloud comments on sentence analysis ( $M = 29.6$ - $38.9$ ) with the largest individual differences among categories ( $SD = 24.7$ - $32.2$ ). Thus there were considerable differences in the total number of think-aloud comments between task conditions and among individuals. In order to examine the relative resources allocation during reading a text, the proportion of think-aloud comments per category was calculated for individual and for task condition.

Table 4. *Number of think-aloud comments for process level and category by task condition*

Process level	Category	Task condition					
		Expression		Image		Critique	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Structure analysis	Word	25.1	21.4	14.6	19.3	7.9	8.2
	Sentence	38.9	28.6	32.9	32.2	29.6	24.7
In-text inference	Backward	5.4	5.5	5.8	4.9	7.0	6.7
	Predictive	0.7	1.3	0.7	0.9	1.3	2.1
Reader response	Association	1.6	2.2	2.0	3.8	2.3	2.1
	Reaction	1.1	1.3	2.1	2.2	6.3	5.8
	Evaluation	1.9	2.1	2.7	3.0	9.0	19.9
Self-monitor		6.2	8.9	7.2	5.5	3.6	3.7
Other		0.8	1.0	0.7	1.0	1.1	2.5
<i>Total</i>		81.7	54.9	68.6	55.3	68.0	37.5
<i>Range</i>		25~165		30~199		27~136	

Table 5 shows a summary of the proportion of think-aloud comments per category as a function of task condition. In all conditions, the largest proportion of think-alouds was on sentence analysis (37-46%) and the smallest proportion on predictive inference (1-3%) and on other (1%). The patterns of the proportions of think-alouds for other categories were different between task conditions.

Table 5. *Proportion of think-aloud comments for process level and category by task condition*

Process level	Category	Task condition					
		Expression		Image		Critique	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Structure analysis	Word	0.28	0.12	0.17	0.08	0.11	0.07
	Sentence	0.46	0.18	0.43	0.21	0.37	0.23
In-text inference	Backward	0.08	0.06	0.12	0.10	0.11	0.08
	Predictive	0.02	0.06	0.01	0.02	0.03	0.07
Reader response	Association	0.02	0.03	0.03	0.04	0.04	0.05
	Reaction	0.01	0.01	0.04	0.03	0.11	0.08
	Evaluation	0.03	0.03	0.06	0.08	0.17	0.22
Self-monitor		0.09	0.08	0.15	0.11	0.05	0.05
Other		0.01	0.02	0.01	0.01	0.01	0.03

In the Expression condition, the proportion of think-alouds on word analysis (28%) was the second largest and much larger than those on other categories (1-9%). Readers in this condition produced 74% of think-aloud comments on the structure analysis level categories (word and

sentence analysis), which is larger than the cases for the other conditions. In the Image condition, the proportion of think-alouds on word analysis (17%) was the second largest and was closely followed by self-monitoring (15%) and then backward inference (12%). The proportion of think-alouds on self-monitoring in this condition was larger than the cases for the other conditions (5-9%). In the Critique condition, the proportion of think-alouds on evaluation (17%) was the second largest, which was followed by reaction (11%) as well as word analysis (11%) and backward inference (11%). Readers in the Critique condition produced relatively large proportions of think-alouds on the reader response level categories (32% for association, evaluation and reaction combined); the proportions of think-alouds on the reader response level in the Critique condition were larger than the cases for the Expression condition (6%) and the Image condition (13%).

In order to examine how task condition affected resources allocation to different levels of processing, *MANOVA* was conducted on the proportion of think-alouds by using three process levels, structure analysis, in-text inference, and reader response, as repetition variables (Table 6). It was found that there was a significant effect of process level,  $F(2,22) = 38.185, p < .0001$ , and a significant effect of the interaction between process level and task condition, *Wilks*  $\lambda = .660, F(4,44) = 2.545, p = .05$ . Further analysis indicated that the Expression condition produced significantly more think-alouds on the structure analysis level than the Critique condition,  $F(1,23) = 6.407, p = .002$ , and there were no significant differences between each of these two conditions and the Image condition. In contrast, the Critique condition produced significantly more think-alouds on the reader response level than the Expression condition,  $F(1,23) = 12.743, p = .002$ , and there were no significant differences between each of these two conditions and the Image condition. On the in-text inference level, there were no significant differences between task conditions.

Table 6. *Proportion of think-aloud comments for process level by task condition*

Process level	Task condition					
	Expression		Image		Critique	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Structure analysis	0.74	0.17	0.59	0.24	0.48	0.22
In-text inference	0.10	0.08	0.13	0.11	0.14	0.11
Reader response	0.06	0.05	0.12	0.10	0.32	0.24

### *Recall*

The means and the standard deviations of the percentage of events recalled as a function of task condition are shown in Table 7. Descriptively speaking, readers in the Image condition recalled best, followed by readers in the Critique condition, and readers in the Expression condition recalled poorest. Statistical analysis revealed that there were no significant differences between task conditions,  $MS = .016, F(2,25) = 1.369, p = .27$ .

Table 7. *Recall as a function of task condition in Experiment 2*

Task condition	<i>n</i>	<i>M</i>	<i>SD</i>
Expression	9	20.6	8.8
Image	9	29.0	13.5
Critique	8	25.0	9.3
Total	26	24.9	11.0

In order to examine the relation between the processes and the products of text comprehension, the correlations were analyzed between recall and the proportions of think-aloud comments for process level and category (Table 8). As for the process level, the proportion of think-alouds on the structure analysis level were negatively correlated with recall, whereas those on the in-text inference level and on the reader response level were positively correlated with recall. As for the category of think-aloud comments, the proportion of association, sentence analysis, backward inferences and reaction had positive correlations, while the proportion of think-alouds on word analysis and self-monitor had negative correlations. None of the correlations were significant at the .05 level.

Table 8. *Correlations between proportion of think-alouds on process level and category and recall*

Process level	Category	<i>r</i>	<i>p</i>
Structure analysis	Word+Sentence	-0.270	0.18
	Word	-0.313	0.12
	Sentence	0.205	0.32
In-text inference	Backward+Predictive	0.239	0.24
	Backward	0.143	0.49
	Predictive	0.009	0.97
Reader response	Association+Reaction+Evaluation	0.288	0.15
	Association	0.358	0.07
	Reaction	0.116	0.57
	Evaluation	-0.060	0.77
Self-monitor		-0.296	0.14

## Discussion

Regarding the first research question: *Does the process of text comprehension (measured by think-alouds) differ when L2 readers have different reading goals?* The results of Experiment 2 suggest that the process of L2 text comprehension may differ in part when the readers process a text with different reading goals. Descriptively speaking, although the largest proportion of think-alouds on sentence analysis was observed in all task conditions, there were clear differences in the patterns of the proportions of think-alouds in some categories between task conditions. These differences suggest that readers in the Expression condition emphasized lower level linguistic processing, word analysis, and produced fewer comments on higher level processing categories, compared with readers in the Image condition and the Critique condition. In contrast, readers in the Critique condition produced more reactive and evaluative comments,

indicating they were engaged more actively in higher level conceptual processing than readers in the other conditions. The patterns of think-alouds in the Image condition were characterized as somewhat in between those for the Expression condition and the Critique condition. Readers in the Image condition produced higher level processing slightly more often than readers in the Expression condition and slightly less often than readers in the Critique condition. Interestingly, readers in the Image condition produced more think-aloud comments on self-monitoring than readers in the other conditions.

In addition, when the proportions of think-alouds were statistically analyzed for three process levels, structure analysis, in-text inference, and reader response, it was found that there was a significant effect of the interaction between task condition and process level. On the structure analysis level, readers in the Expression condition produced significantly more think-aloud comments than readers in the Critique condition and there were no significant differences between the Image condition and each of the other conditions. On the in-text inference level, there were no significant differences between task conditions. On the reader response level, readers in the Critique condition produced significantly more comments than their counterparts in the Expression condition and these two conditions did not differ significantly from the Image condition.

These findings suggest that these L2 students were strategic in allocating resources to various levels of information processing according to a reading goal they set after having received task instructions. When reading a text for words and expressions by especially paying attention to unfamiliar ones (i.e., the Expression condition), L2 readers allocate greater amounts of resources to lower level processing, especially words and phrases, at the structure analysis level. When reading a text for critique by reacting to and evaluating the text/the author (i.e., the Critique condition), on the other hand, L2 readers utilize greater amounts of resources for higher level conceptual processing, especially reaction and evaluation, at the reader response level. When reading a text for imagery by visualizing the content (i.e., the Image condition), the patterns of resources allocation by L2 readers were characterized as somewhat in between readers in the Expression condition and the Critique condition. Presumably because the extraction of propositions from sentences was rather labor-intensive for these readers with limited L2 proficiency (as indicated by the largest proportion of think-alouds on sentence analysis in all the conditions), they had fewer cognitive resources available for higher level conceptual processing. As a result, the effect of a reading goal on the resources allocation during the process of L2 text comprehension was rather limited, observed only at some of the general processing levels. In addition, there were small differences between task conditions in terms of the relative amounts of resources allocation to various categories. Similar findings were reported in an L1 study which compared readers with high and low working memory (Linderholm & van den Broek, 2002).

Regarding the second research question: *How does the process of comprehension (measured by think-alouds) relate to the product of comprehension (measured by recall)?* The results of Experiment 2 provide only an inconclusive answer. The findings that there were no significant correlations between recall and the proportion of think-alouds on process level and category (except association) suggest the relation between the processes and the products of L2 text comprehension is complex and not straightforward. Descriptively speaking, readers who generated more associations and engaged more intensely in sentence analysis during reading

recalled better, while readers who emphasized word analysis and more heavily self-monitored during reading recalled more poorly. Deliberate extraction of propositions from sentences and active use of general knowledge during reading, if they are accurate and appropriate, are believed to contribute to the construction of a more coherent representation of the text (propositional text base and situation model). Heavy attention to word analysis and self-monitoring during reading is related to, and most likely indicative of difficulty in, word recognition and understanding the meaning of the current sentence or the text.

In order to obtain a better picture of how the comprehension processes or the resources allocation during reading differed between readers who had different reading goals, a qualitative analysis of think-alouds was conducted. Although there were large individual differences among readers within each task condition, as already mentioned in the results section, there were some patterns of behaviors that are more common in each of the three task conditions.

In the Expression condition, the frequency of think-aloud comments on word analysis was much higher and more various ( $M = 25.1$ ,  $SD = 21.4$ ,  $Range = 3-43$ ) than in the Critique condition ( $M = 7.9$ ,  $SD = 8.2$ ,  $Range = 1-26$ ), and the average frequency on this category was slightly higher than in the Image condition ( $M = 14.6$ ,  $SD = 19.3$ ,  $Range = 2-62$ ). Typical think-aloud comments in the category of word analysis are “I don’t know (the meaning of the word) ‘X,’” and “What is (the meaning of the word) ‘X?’” Many readers in the Expression condition produced these kinds of comments for words such as *peddling* (5/9), *discourteous* (5/9), *strain* (6/9), *surmise* (6/9) and *latter* (4/9). Some of the comments in this category indicate explicit analysis of the formal or the semantic features of an unfamiliar word or expression, as in “(The word) *instilled* is *in* plus *still(ed)*” (2/9), “(The word) *discourteous* is a negative form of *couteous*” (2/9), and “(The word) *indifferent* is *in* attached to *different* so (it means) ‘not different’?” (3/9). Although these types of comments on word analysis were also observed in the think-alouds produced under the Image condition and the Critique condition, the frequency of occurrence and the number of individuals producing such comments were higher in the Expression condition. In fact, two readers in this condition produced think-aloud comments only on word analysis for as much as 33% of the total sentences; their recalls were below the average of this condition.

In some cases, readers in the Expression condition produced considerable amounts of think-alouds on analysis of a particular word or phrase while trying to figure out the meaning of the current sentence. As shown in the following example, a prolonged, deliberate analysis of an unknown word, in combination with guessing from the context, may reach an acceptable meaning of the word, which contributes in return to the understanding of the event described. Participants produced their verbal reports mostly in L1 Japanese. Here all the verbal reports are presented in English translation with the parts produced in English being underlined italics.

The importance of eye contact is ..... What is *instilled*? It’s not *install*. *Still* means ‘not yet.’ Humm. What’s *national soccer team*? Hans Ooft is the coach of the Japanese soccer team. Oh, I understand. I wonder what *instilled* is. Hmm. Maybe it means ‘to be adapted’ or something. So this means that eye contact is also important in soccer. Yeah. OK. (at Sentence 18)

However, heavy allocation of resources to word analysis may promote word-by-word translation, which may leave fewer resources available for conceptual processing, relational and integrative



processing in particular, and disrupt the consecutive building of a coherent situation model representation. The following think-aloud comments were produced by one reader in the Expression condition at the beginning and toward the end of the text.

It opened in the year of 1964. It says super-express so it's super-express. Tokaido Shinkansen is switched. To quiet means quietly. Sales methods is sales. Methods'is method. The super-express line is opened in 1964. Since means since. Since the line was opened. Sales have been is something done too much. Traditional is cultural. Although is although. The things things are being offered. For sale is in order to sell. There is something different. Among the things sold there are some different things, but. (at Sentence 2)

... A variety of means different kinds of something. Different kinds of test. Company and to, to conclude. Concludes is to make a conclusion or decision. Accord is according to something. According to Takao Yoshida. He is the farmers business manager. Agriculture or something. He is a manager, an employee of a business related to that. (at Sentence 11)

This kind of heavy attention to and laborious analysis of a particular word or expression may have caused fewer resources available for higher level processing. If the reader allocated more resources to higher level processing, she might have benefitted from using more global strategies such as getting the gist meaning of the sentence and from generating inferences from relevant general knowledge. Despite the fact that readers in this condition spent (on average) longer times on processing the text (842 sec) than readers in the Image condition (721 sec) and the Critique condition (800 sec), they recalled smaller amounts of content (21%) than those in the Image condition (29%) and the Critique condition (25%).

In the Image condition, readers appeared to have processed the text more “naturally” or more comfortably than readers in the other conditions. Readers in this condition also processed the text faster on average (721 sec) than their counterparts in the other conditions (801-842 sec). In general readers in this condition produced fewer think-aloud comments on word analysis and more frequently commented on a larger structure such as clause and sentence; they did so without many interruptions by comments on a particular word included in the sentence, compared with their counterparts in the Expression condition. They often tried to infer the meaning of an unknown word by using contextual information or inferences based on general knowledge as in the following examples.

What is this discourteous? ... Maybe it means that if you keep looking too long, it makes the passenger feel annoyed. (at Sentence 9)

... Without being conscious of doing so. One person can see? or look at the other person's eyes. I don't know the word surmise. Hmm ... by looking at the eyes, hmm ... something like sense the feelings. Surmise probably means something like to sense or to estimate (at Sentence 16)

Presumably because they were not so much concerned with perfect word recognition, readers in the Image condition engaged more actively in conceptualizing the content of the text by generating various inferences from general world knowledge and literacy knowledge. Some exemplar comments from different individuals are shown below.

Announcement in the train? Like the one I hear, the announcement about souvenirs aboard the Shin- the train when I'm going back home? (at Sentence 7)

Oh, of Shinkansen, the one about Shinkansen was an example and ... What the author wants to say is about eye contact. If I remember correctly, eye contact, generally the time for normal eye contact is less than 60% of the time a conversation lasts. Is this about Americans? (at Sentence 13)

Coach Ooft, I've heard of him. In soccer eye contact is important. 'Look up! Look up is important,' yeah, I remember Coach Jiiko saying that. (at Sentence 18)

These examples indicate that readers attempted to make connections between pieces of textual information or between textual information and general knowledge by retrieving prior textual information and generating inferences from general knowledge (often based on personal experiences). Backward explanatory inferences, if appropriate, should contribute to the building of a more coherent textbase and situation model representation of the text. Elaborative and associative inferences can help strengthen the connections between textual information and general knowledge. The findings that readers in the Image condition produced the largest amount of content of the text in both Experiments 1 and 2 may be related to their active conceptual processing, especially relational and integrative processing, while going through the text.

In addition, readers in the Image condition more frequently commented on the degree of their own understanding (e.g., "I understand the last part of the sentence only." "I'm not sure.") and on use of strategy upon encountering difficulty in understanding the meaning of a sentence (e.g., "Move on to a next sentence."). Being encouraged to "visualize" the content of the text, readers in this condition appeared to compensate for their imperfect lower level processing at the word and sentence levels by relying on contextual information or inferences generated from general knowledge. These findings seem to be in line with the kind of interactive compensatory processing that has been reported in previous L2 research (e.g., Horiba, 1996; Stevensen, Schoonen, & de Glopper, 2003).

As for the Critique condition, many readers appeared to have difficulty in verbalizing their thoughts and produced shorter utterances with longer pauses in between. On average, their reading times were longer and their numbers of think-aloud comments were smaller compared with those in the Image condition. As already mentioned, comments on word analysis were much less frequent and comments on reaction and evaluation were much more frequent in this condition than in the other conditions. It is assumed that the think-aloud data reflect some of the processes that are readily accessible to consciousness and codable in language (Ericsson & Simon, 1980). The task requirements of critiquing and evaluating the text or the author are conceptually more demanding than a basic level understanding of what is explicitly described in the text. The fact that shorter utterances with longer pauses in between as well as fewer comments on structure analysis were found in think-alouds suggests that readers in the Critique condition were pushed or rushed to quickly understand what the current sentence or portion of the text is describing before they could make some reactive and evaluative comments.

In fact some readers (4 out of 8) in the Critique condition employed a "strategy" of processing

the entire sentence silently and then producing some evaluative or reactive comments while progressing through the text. Because forming one's own comments and critique to the text or the author and to verbalize them is rather demanding, readers in this condition, at least some of them, may have experienced "cognitive overload" and become less successful at extracting propositions from sentences to achieve a basic level of text comprehension. Indeed readers in the Critique condition recalled (on average) more poorly than the readers in the Image condition. One of such readers who made many reactive and evaluative comments during reading and recalled poorly produced her think-alouds as follows.

I think by looking at the passengers' eyes for a long time, the salesperson can sell things more easily. (at Sentence 9)

I think looking for a short time ... if she looks only for a short time, she ends up passing by even when someone wants to buy things. So that is not good, I think. (at Sentence 11)

I think making lots of eye contact during conversation is important. (at Sentence 12)

I think making eye contact during conversation is a natural thing to do. (at Sentence 13)

I don't fully understand this sentence, but I wonder if eye contact is not such a natural thing to do. (at Sentence 14)

The effect of cognitive challenge in this condition may be related to other kinds of behaviors. Most reactive comments produced were short (e.g., "Oh, I see." "That's too much."), and rather emotional (e.g., "I don't like it"). Furthermore, some readers seemed to perform the task at an easier level and be satisfied with the generation of explanatory or associative inferences on the basis of general knowledge. It was as if they set lower standards for coherence to achieve their reading goal (c.f., van den Broek, Ridsen, & Husebye-Hartmann, 1995). There were more cases in which readers produced more explicit explanatory and associative comments in the Critique condition, compared with the Image condition. Some examples produced by different readers are:

One method is that the selling person shows things to people who are seated and checks or asks if they want something. Is this something we often see when we board a Shinkansen and the like? It may be the one like a woman coming pulling something. (at Sentence 6)

... Passengers' eyes ... making the passengers notice. Trying to make the passengers notice, because they can't buy unless they notice. (at Sentence 8)

... Normally the time of eye contact is less than 60% of the time of conversation. I see. But I don't do it so often. (at Sentence 13)

These observations in the qualitative analysis of think-alouds in Experiment 2 seem to corroborate the findings on the correlations between L2 reading and L2 proficiency and general comprehension skill in Experiment 1. Possibly because emphasis on word analysis in the Expression condition had mixed consequences in terms of building a coherent meaning representation of the text, there were no reliable correlations between L2 proficiency and L2 reading. Probably because more balanced interaction between bottom-up linguistic processing and top-down conceptual processing occurred in the Image condition, both L2 proficiency and

general comprehension skill had reliably correlated with L2 reading. Because higher level conceptual processing was asked for in the Critique condition, there were stronger correlations between L2 reading and general comprehension skill than in the other conditions. These interpretations are, however, only speculations and need to be verified with further research.

Finally, although the present study benefitted from the mixed methods approach, there were some limitations of the study as well as some new questions derived from the study's findings. First, Experiments 1 and 2 together enabled us to examine the effects of reading goal (induced by task instructions) on the processes and the products of L2 text comprehension (via think-aloud and recall protocols, respectively). Qualitative analysis combined with quantitative analysis of think-alouds helped gain insights into the complex and variable nature of L2 text comprehension. However, lack of measures of L2 proficiency and general comprehension skill in Experiment 2 did not make it possible to directly test the correlational findings of Experiment 1. In this connection, treating task condition as a within-subject variable would be even better if we want to know how individuals may alter their modes of processing and strategy use depending on the reading goal.

Second, although there was no significant task effect found on recall in both Experiment 1 and Experiment 2, there were some differences in patterns of recall between the two experiments. Descriptively speaking, readers in the Critique condition recalled more poorly than readers in the Expression condition in Experiment 1 while readers in the Critique condition outperformed those in the Expression condition in Experiment 2. It was assumed that individuals can recall more content information of the text if they have constructed a more coherent memory representation of the content of the text (i.e., text base and situation model). The differences between the two experiments regarding the patterns of recall for task condition may be related to reader characteristics or experimental task design or both. The participants in Experiment 1 were younger and probably less mature as readers than the participants in Experiment 2. The kind of higher-order conceptual processing at the reader-writer communication level (as expected in the Critique condition) is related to critical academic literacy and the readiness level or cognitive-linguistic maturity of the students. In addition, reading a text with the think-aloud technique involves more than reading the same text silently. Use of the think-aloud technique during reading may not affect the products of comprehension (Horiba, 1993), while it may cause extra cognitive load in processing, which, if not too demanding, can promote more active engagement of the reader (e.g., Loxterman, Bech, & McKeown, 1994; McDaniel et al., 1986). These possibilities need to be directly examined with future research.

## Conclusion

This research study investigated the effect of a reading goal (i.e., to read for expression, for image, and for critique which were elicited by task instructions) on the processes and the products of L2 text comprehension. Based on the findings of the study, the following conclusions are made. First, L2 readers who are competent readers in L1 try to adjust their cognitive processes and strategies according to a reading goal that they set upon receiving different task instructions. Second, the correlations between L2 reading and L2 proficiency and general comprehension skill differ depending on the reading goal. Third, although the processes of

comprehension and the products of comprehension are causally related, the effects of a reading goal may be more clearly observed on the processes of comprehension than on the products of comprehension.

Despite the general nature of task instructions used in this study, it is noteworthy that different modes of processing were clearly observed in L2 students' think-alouds (Experiment 2) and that different patterns of correlations of L2 proficiency and general comprehension skill were found for recall under different task conditions (Experiment 1). In this study, participants were only told to read a text in a certain way (i.e., read for expressions, for image, and for critique). These task instructions are more general than the read-for-coherence instructions (i.e., pay attention to the relation between sentences) used in Horiba (2000: Experiment 2). If they are asked to engage in an additional behavioral task such as answering questions, outlining and crossing out some letter during processing a text, as in prior L1 research (e.g., McDaniel et al., 1986), L2 readers may show more distinct processes and strategies depending on the task specification.

By using both recall and think-alouds, this study has shown the value of investigating the effects of reading goal on the processes and the products of text comprehension within a single research study. Readers try to construct meaning representation of the text by utilizing textual information and inferences based on general knowledge moment by moment as they progress through the text. What can be inferred from the products of comprehension differs from what can be inferred from the processes, though the processes lead to the products. As observed in the qualitative analysis of think-alouds, L2 text comprehension is complex and various, involving many different processes that may interact and compensate with one another. Yet L2 text comprehension is not fully understood; therefore, further research is needed in which key variables related to the reader, the text and the task are carefully treated.

Finally, some educational implications for L2 learning and teaching are drawn on the basis of the study's findings. First and foremost, selection and implementation of tasks should be made more carefully. Even with the same text, different modes of L2 text processing and different contributions of L2 proficiency and general comprehension skill to L2 reading may occur when different task instructions are given or when students set different reading goals. This issue is critically important in the testing context. Second, L2 students who are proficient in their L1 reading should be given opportunities to process texts for different goals. Carefully designed sequences of tasks or subtasks can help the students experience different modes of text processing, become more aware of their own processes and develop flexible strategic reading proficiency.

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## Appendix A

### *A Sample Passage: The Eye Text (The English Version)*

#### Eye Contact

According to a newspaper report, the company selling food and drinks aboard Tokaido Shinkansen superexpress trains is switching to “quiet” sales methods. Since the superexpress line opened in 1964, sales have been conducted in the traditional *osen ni kyarameru* (rice crackers and caramels) hawking style, although the things offered for sale are different. Now that peddling style is being dropped.

Because many people would like to rest while on a train, the new quiet sales approach is welcome. Two specific sales methods have been adopted. One calls for the salesperson to try to catch the eye of each seated passenger to judge whether or not the passenger wished to buy something. The other requires the salesperson to announce the items available in a quiet voice audible only to the passengers occupying the nearest three rows of seats as the salesperson passes through a car.

What is interesting is the way the salesperson is supposed to catch the eyes of passengers. It would be discourteous to look at the eyes of a passenger too long. A short look might give the impression that the salesperson is indifferent.

A variety of tests have led the company to conclude that three seconds is the limit for appropriate eye contact, according to Takao Yoshida, the firm’s business manager. This reminded me of a study carried out by American psychologists on how long eyes met during conversations. If I remember correctly, their finding was that normally the time of eye contact was less than 60% of the time a conversation lasted.

The psychologists also found that if a person looked at the eyes of another longer than that, it was under “unusual” circumstances – either they were quarreling or in love. Extremely short eye contact is also taken by experts as signaling psychological strain.

Without being conscious of doing so, one looks at the eyes of other people to surmise what goes on in their minds. But anyone trying to observe the three-second rule of the food and drink sales company is likely to find it hard to practice.

The importance of eye contact has been instilled in the members of the Japan national soccer team by its coach, Hans Ooft. Training under him in passing the ball by sending signals with the eyes has served to score goals in matches.

In our daily lives, we see two kinds of people – those who keep gazing at the eyes of the other party while the subjects of their conversation change from one to another and those who keep their eyes turned away. When a mother monkey scolds her child she looks squarely into the latter’s eyes without fail, according to research on monkeys.

## Appendix B

### *Categories of Statements in Verbal Protocols and Examples*



[Readers produced verbal reports mostly in L1 Japanese. Here the Japanese data are presented in English translation with the parts produced in English being underlined italics. S = Sentence]

Process level	Category	Definition	Example
Structure analysis	Word analysis	The reader attempts to analyze the formal or semantic features of a word or a phrase.	“ <i>Indifferent</i> is... <i>in</i> plus <i>different</i> / so it means ‘not different’.” (at S10) “What does <i>strain</i> mean?” (at S15)
	Sentence analysis	The reader attempts to analyze the formal or semantic features of a clause or a larger part of the current sentence. This category also includes L1 translation and paraphrasing of the sentence.	“They started to sell the caramels/ after the Shinkansen line opened.” (at S2) “They thought they don’t need the peddling style any longer.” (at S3)
In-text inference	Backward inference	The reader generates an inference which is intended to explain the contents of the current sentence by connecting it to prior text or on the basis of general knowledge.	“Two sales methods that people preferred more/ were adapted.” (at S5) “Unless the salesperson can notice,/ a passenger cannot buy anything from her.” (at S6)
	Predictive inference	The reader anticipates something about what will occur in the incoming text.	“So the other one is coming next.” (at S6) “I think this will be taken up again later.” (at S1)
Reader response	Association	The reader generates an inference that is brought to mind by the text that is not intended to enhance the understanding of the textual information.	“Three-seconds rule, but this is not the one in basketball.” (at S11) “My name is also Yoshida.” (at S11)
	Evaluation	The reader makes a comment or states an opinion about the text that is evaluative.	“I think Japanese people look at each other much less,/ so they may belong to the latter group.” (at S20) “I don’t think that they can make good eye contacts in such a huge field.” (at S19)
	Reaction	The reader makes a comment to react, often emotionally, to the text.	“I don’t like it.” (at S6) “Sounds interesting.” (at S12)

Self- monitoring	The reader makes a comment about the degree of his/her own comprehension or use of a reading strategy.	"I don't know what this says/ so I'll move on." (at S16)	
Comment on text structure	The reader comments about the structure of the text.	"The title Eye contact was derived from here." (at S6)	
Other	The reader comments on things that are not directly related to their comprehension of the text.	"I wonder if this is related to that Eye-Eye (i.e., the practice text)." (at S21)	

## Appendix C

*A Sample of Verbal Protocols Produced at the Beginning (Sentences 1-7) and the Ending (Sentences 18-21) of the Eye Contact Text in the Read-for-Expression, for-Image, and for-Critique Condition in Experiment One.*

[The text was presented in English. Readers produced verbal reports mostly in L1 Japanese. Here the Japanese data are presented in English translation with the parts produced in English being underlined italics. S = Sentence]

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*Verbal protocols in the Expression condition (Recall = 30)*

(S1) According to a newspaper report. According to a news report. .... What does aboard mean? Aboard. The company who sell meals and drinks in Shinkansen trains. No, the company is selling. .... What is quiet sales methods? It will probably be explained later, I'm sure. Sounds like a key word, quiet sales methods.

(S2) Since Shinkansen opened in 1964, sales have been...... What is that? Hawking style. Sales have been....., ha? Have been conduct. Conduct, to conduct. Ha? In the traditional. What is osen ni kyarameru? It sounds like Japanese, but I don't know. Rice crackers and caramels...... What is it? Hawking style. Hawking, hawking has an image of walking, but I don't know its meaning. Although the things...... The things offered, to request? For sale are, request? Although. What is requested for sales is different. I don't understand. Umm maybe it's okay that I don't understand this sentence.

(S3) Peddling style. I don't know the meaning of peddling. Peddling style...... Drop, to drop. Drop is probably a word with multiple meanings, but I don't know its meaning in this context.

(S4) Umm many people would like to ...... They often rest while they are on a train. Well, for commuters the train is the only place, if they can sit, they can rest. The new quiet sales approach is welcome. Oh, the sales approach in a quiet voice, not in a loud voice, by considering they are resting, is welcome.

(S5) What does adopted mean? Two specific. Two certain sales methods are adopted umm... maybe exist, as the quiet sales methods.

(S6) One of the two calls for ...... Hum? To try to catch...... Umm. Any way, it's like know whether or not they want by looking their eyes, something like that. One calls for....., yeah, passenger .....

(S7) Hum? The salesperson ...... Announce announce the items on sale. In a quiet voice. Announce in a quiet voice. I'm not sure what audible means, but only to the passengers ...... I'm not sure what row in three rows means, of seats. Well, maybe it means a voice that can reach to about three seats. Seats as ...... Yeah. So one is umm... what is it? Umm... The method is to understand with eye contact, or to ask in a quiet voice that can reach as far as about three seats.

.....  
(S18) Importance of ....., what is it? I don't know instilled. In the members ..... Hmm...I don't know. Hmm the soccer team coach, Hans Ooft. Ooft, where did he come from?

(S19) Oh, I was wondering how it's related to soccer, but it's linked to passing the ball. Passing the ball ..... in matches. Sure, in soccer, yeah, eye contact is pretty important, when passing the ball.

(S20) Two kinds of people, that's so few. those who gazing...... Turned away. Hmm. Who keep gazing at the eyes of other party. Party? Other party. What does party mean? I don't know its meaning in this context. While the subjects ...... Oh, people who gaze and umm there are people who gaze fixedly and people who turn their eyes away. Well, Japanese people probably belong to the ones who don't make much eye contact.

(S21) The latter's eyes, latter? The latter's eyes. I don't know latter. When she gets angry, the mother... I don't know what squarely means. Latter's eye, latter's eye. Hmm. But she stares fixedly, probably, but I don't know.

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*Verbal protocols in the Image condition (Recall = 44)*

(S1) Hmm? What is this all about? Oh, oh, maybe it's about selling things aboard trains.

(S2) Hawking, I wonder what it means. O osen ni kyarameru, kyarameru, hmm? Since the superexpress Shinkansen opened, the caramel started to be sold. Hmm.

(S3) What does dropped mean? Dropped. ... Does it mean that the style of pushing a cart to sell aboard trains still continues?

(S4) Because. Many people want to rest while they are on a train. Because they want to rest, the new sales method is welcome. Oh, maybe they were selling things in some noisy method.

(S5) Two specific sales. Specific sales methods were adopted. What are they, the two?

(S6) The salesperson comes to each seated passenger, and by making eye contact judges whether or not the passenger wants to buy something.

(S7) Hmm? Announcement within a train? Like the one I hear, the announcement about souvenirs aboard the Shin- the train when I'm going back home?

.....  
(S18) Ooft, Coah Ooft. I've heard the name. The importance...... Umm eye contact is important in soccer. "Look up! Look up is important," yeah, I remember Coach Jiiko saying that.

(S19) I think this sentence says eye contact is important in soccer matches. Eye contact. Unless you look at the face or the eyes of the other, you can't tell what he is thinking about, so you can't play or you can't put a strategy into action.

(S20) In our daily lives, umm we see two kinds of people there are two kinds of people. I wonder what gazing means. People who keep watching others, the other group. While they are having conversation. From one to another, what is that? One to another, and those who keep their eyes turned away, ignore. What does turned away mean? Oh, I forgot the word, turned away. There are people who keep watching and people who do not, so people who watch less frequently.

(S21) Hmm? When a mother monkey scolds her child. Squarely into the latter's. What does latter's mean? Latter's eyes ..... Mother love? She stares fixedly at him when she scolds him. I'm not sure.

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*Verbal protocols in the Critique condition (Recall = 37)*

(S1) Company selling ..... Hum? How is this going to be linked to the title?

(S2) ...osen ni kyarameru... ... Hum.. I have never heard of it.

(S4) Now that peddling peddling style ..... Peddle, I don't know.

(S5) Hum? Hum hum. So they have become quiet?

(S6) Two, two. What are they?

(S7) Hum, but that would be rather annoying for the other party (the target person).

.....  
(S18) ...eye contact has been instilled, what does it mean? Hans Ooft, I don't know.

(S19) Humm ... I don't think they can make accurate eye contact in such a huge soccer field.

(S20) I think I belong to the latter group, for sure.

(S21) .....according to research on monkeys. Why does this talk about monkeys in the end?

### **About the Author**

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